



United States Military Academy West Point, New York 10996

TOTAL ARMY PERSONNEL DATABASE RELIABILITY STUDY

OPERATIONS RESEARCH CENTER TECHNICAL REPORT 97-5-1

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A TECHNICAL REPORT OF THE OPERATIONS RESEARCH CENTER UNITED STATES MILITARY ACADEMY

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Executive Summary

We identified the issues which led to this study while conducting research for another project. In that project, we wanted to use promotion/demotion and ETS rates from a model which is managed by GRCI for the Office of the Deputy Chief of Staff, Personnel (ODCSPER). We found (from many sources) that the input data for the models was not very reliable. This data came from the Total Army Personnel Database (TAP-DB) which fed the Enlisted Master File (EMF). In an effort to fix the problem, we undertook this study with a three-fold purpose:

1. To determine the current state of the enlisted personnel management system.

We found that there was not one glaring problem in the system. The individual parts of the system seemed to all be working well. Taken as a whole however, the system did not perform to the level required or expected.

2. To review any on-going initiatives to improve the overall reliability of the system.

We found that there are a number of outstanding initiatives being developed and fielded throughout the Army and the Department of Defense including consolidating and upgrading the database. There are other initiatives which maximize the technological advances in recent years. Some of the most promising are the Force Manning System (FMS) and the Multi-Technology Automated Card (MARC), or the Smart Card. The FMS is a software package which is designed to link the TAP-DB with the field PACs using a Windows-based environment. The Smart Card has a computer chip in it which can securely store data such as personnel information.

3. To recommend future directions for improvement of the overall system.

Our recommendations are based on combining current initiatives and integrating them into one large system. Specifically, we recommend the following:

Consolidate, upgrade and standardize the database. The consolidation and upgrading is currently being done in PERSINSD. They need to conduct a study and standardize the inputs to match the outputs without translation. An example is the date format within the system. The input is a eight digit but the Enlisted Master File requires a 6 digit code. There should be one standard. Change the other systems to accommodate each other.

Further develop and field the Force Manning System or another similar software package. This has to be the future of personnel information management. Even SIDPERS-3 which is currently being fielded is out-of-date.

Move to near-complete automation with the use of the smart card technology. The card can automatically refer a personnel clerk to the appropriate file. We can use the cards to automatically link a order to a arrival and a departure transaction. There will be no manual inputs required. Again, this is the future that we must develop today.

We were surprised when we discovered the initiatives currently being developed. We were also surprised that so few people in the personnel management community knew about them. Informing people involved in the overall system of these initiatives may be the greatest use of this study. The Army is working hard to improve on the system reliability, we just need to attempt to fix the entire system and not simply patch a problem as we have done in the past.

1. Introduction

The management of 400,000 or more items of inventory is fairly common in businesses throughout the United States and the world. It is not an easy task, but clearly doable by much of corporate America. The problem becomes increasingly more difficult when that inventory is located throughout the world, when it moves at a moments notice or when its characteristics can change on an almost daily basis. Compound these management problems, and many others, with the fact that the inventory consists of people and you have the nearly impossible task of managing the United States Army personnel system.

Army managers need a great deal out of a personnel inventory system. They need to know where each soldier is and when that soldier arrived at that location. The system should also provide reliable data to personnel strength management prediction models so managers can predict with some degree of reliability how many and of what specialty soldiers it should recruit, promote, reassign, or allow to leave the service.

The effects of misstep or mismanagement are as obvious as they are serious. If a civilian organization becomes "backordered" on a product, the customer simply waits or finds another supplier. If the Army does not have enough inventory in a specific specialty and/or grade, a unit's readiness suffers, which could cause the Army readiness to suffer and lives to be lost. It is the fabled "For the want of a nail the kingdom was lost." scenario.

With this being such an important enterprise and the potential costs being so great, a casual observer would expect a closely managed, highly reliable system. Unfortunately,

this is not completely the case. The system is closely managed. It is not as reliable as it must be, however.

2. Purpose of Study

We entered into this study with a three-fold purpose. First, we wanted to determine the current state of the enlisted personnel management system. We wanted to find out from the individuals who worked within the system, what the problems were. Second, we wanted to review any on-going initiatives to improve the overall reliability of the system. Third, we wanted to recommend future directions for improvement of the overall system. We knew that there were people working on the individual problems. We tried to focus on the system as a whole and obtain a broad-based view for recommending improvements.

We found out, not surprisingly, that there are problems with the database and the entire personnel information management system. When we set out to discover what these problems were, we did not expect to find one glaring, obvious problem - and we did not. There is not one person who is "asleep at the switch." There is not one organization fouling up the entire process. What we found was that the individual parts of the system worked quite well, in general. When they worked together, however, the system did not function correctly all the time.

We also found that there a number of personnel managers and agencies taking great strides to fix the problems. Unfortunately, many people close to the system were not aware of these initiatives. For our analysis, we took the approach that we should not try to simply fix the problems, but rather try to fix the system. Our recommendation

includes many ideas currently under consideration at the Personnel Information Systems Directorate (PERSINSD), such as the consolidation and reorganization of the Total Army Personnel Database (TAP-DB). We also recommend that the system take advantage of 21st Century technology. The use of developed capabilities such as the Multi-technology Automated Reader Card (MARC), or Smart Card as it is often called. We also discovered the Force Manning System (FMS) software program. This is an initiative under development in the Military Systems Division within PERSINSD. This software package would greatly increase the automation of the system and reduce error rates considerably. In the following paragraphs, we discuss our recommendations and findings in greater detail.

3. Recommended Solutions

3.1. Consolidation and Standardization

The Army needs to immediately move to consolidate and upgrade the personnel databases and standardize the internal codes. There are currently six separate databases which make up the TAP-DB, some of which are the Active Regular Enlisted database, the Active Regular Officer database, and then reservist databases. This may have been necessary in the past due to computer limitations. With current capabilities, this is no longer required. The different databases cannot interact and require different maintenance. Organizations which pull from each database require extensive effort to obtain reports.

Colonel Lawrence C. Doton, Chief, Military Systems Division in PERSINSD stated that the consolidation efforts have already begun¹. Colonel Doton stated that the consolidated system will be in place by 1998. This claim is supported by Army Deputy Chief of Staff for Personnel (DCSPER), Lieutenant General Frederick Vollrath, in his comments in a recent *Army Times* article. In the article, LTG Vollrath stated that "information does not move freely between the components,"² and that the consolidated system should be introduced next year. This is the first step to consolidating all Army personnel management agencies. The next step will be the consolidation of all joint agencies. This will result in improved, standardized databases and a reduction in the overhead required for maintenance and management.

Along with the consolidation, the Army is working for standardization of the input and output codes. Currently there are "translators" between the information coming in from the field and the TAP-DB. These inputs come from various sources, one of which is the Standard Installation/Division Personnel System, or SIDPERS. There are also translators coming out of the TAP-DB to output the data in the format required by the individual agencies. An example is the problem of dates. Different agencies need the dates in different formats. The dates are managed within the system in a 8 digit code (YYYYMMDD). Some agencies use the dates in this format, some use a 6 digit format (YYMMDD). The translation of these date formats sometimes leads to errors. According to COL Doton, the standardization of the codes, the upgrading of the databases, and the introduction of the newest version of the SIDPERS, SIDPERS-3, will eliminate many of the problems caused by this conversion.

¹ Interview with COL Lawrence Doton, Mrs. Wanda Damon and Mrs. Terry Johnson, 6 March 1997.

A great number of other problems will be solved with the complete fielding SIDPERS-3. SIDPERS-3 will not only be a software improvement. The hardware and the process for passing the information will improve also. In the SIDPERS-3 system, transactions will not only be dated (as SIDPERS-2 transactions are), they will have a time attached to them. Lieutenant Colonel Kendall Cox, Office of the DCSPER, stated that the inability to accurately time stamp personnel data transactions in the current system creates a great number of errors³. One of the problems with only dating the transactions is numerous transactions in a given day. In this situation, the TAP-DB chooses the order of the transactions. If that is not the actual order, the "correct" data is lost, though the initiating unit sees a processed transaction. The SIDPERS-3 fielding plan includes issuing hardware and software to installations and users at various levels within a command. The hardware link will allow installations to send personnel information on a daily basis. Installations currently can only send it twice a week at best.

3.2. Force Manning System (FMS)

Unfortunately, SIDPERS-3 is not the utopian solution it was originally touted to be. The system has some serious shortcomings, not the least of which is that it is a UNIX-based system and is cumbersome to use. Almost the entire computing world is operating in a Windows environment (including most of our soldiers now) and yet our personnel data management system is not Windows-based. Based on our research, we determined that the personnel management database for the future Army should be Windows-based and be mobile enough to use on a battlefield. It should also allow a personnel manager at all levels immediate link to the TAP-DB. Fortunately for the Army,

² Tice, Jim, "Glitches skew demographics", *Army Times*, p. 16, May 12, 1997.

the next personnel management system will have all of these things. At least it will if it is based on the Force Manning System (FMS) developed by the Military Systems Division, PERSINSD under the direction of COL Doton. This was a project developed for the Army Soldier Support Center to be part of the Force XXI experiment.

COL Doton and his staff provided us a copy of the prototype which was recently fielded to the EXFOR at Fort Hood. We recently tested this system for its ease of use and applicability. This is an outstanding initiative. It allows personnel managers at all levels to link directly into the TAP-DB and download personnel information for soldiers assigned to their command. They can quickly and easily arrive and depart personnel to and from their units. When they are linked via LAN or modem, the information can be passed immediately. When not linked, they can hold the data and save it up to the main database at any later time. Personnel managers can even use the built-in equipment manning feature to assign personnel to individual vehicles, such as tanks or trucks. They can assign soldiers directly to squads and platoons. The information is passed directly to all levels. The system also has a feature to estimate casualties so as to allow personnel managers to preposition replacements.

The results of the impact of the system in use with the EXFOR during the recent NTC rotation are not available, but we expect that the system should receive rave reviews, at least conceptually. Users should expect problems as with any prototype system, but this should be the direction the Army personnel managers follow in developing the next generation system. With all the money allocated SIDPERS-3, it is politically and financially infeasible to drop the program and follow the FMS track. We

³ Interview with LTC Kendall Cox, 11 February 1997.

do not currently recommend this. The FMS must have more development and testing, but it is a great start. The best news is that it can use much of the same hardware currently being fielded with SIDPERS-3. This will greatly reduce the cost of fielding the FMS.

3.3. *Near-Complete Automation*

The final feature of our recommendations to improve the reliability of the personnel databases is also a capability of the FMS: the use of the Multi-technology Automated Reader Card (MARC) to more completely automate the personnel system. This card contains a computer chip which allows the transfer of information to and from the card. Personnel clerks at all levels can use this card to immediately - and automatically - call a soldier's record. They then can update the record and save the new information on the card. Information can be transferred quickly and easily from the database to the card and vice versa. The card has a great number of applications throughout the Army.

An area which can benefit greatly from the use of this card is the orders process, and especially arrival and departure transactions. For illustration purposes, envision a soldier assigned to a unit in Germany who receives a levy for reassignment to Fort Bragg, NC. Prior to arrival at Fort Bragg, the soldier will have to attend Airborne School TDY enroute. The soldier proceeds to the reassignment clerk who asks for the soldier's Smart ID card. Upon inserting the card into the reader, the clerk automatically calls up the soldier's record and reassignment instructions, or Request for Orders (RFO). The clerk then inserts his or her "access" card into the reader and inputs the PIN number⁴. By

⁴ This access card is just one of the security measures of the MARC system. Only with the correct access card can someone update information on the card. For example, a doctor can update a soldier's medical information with his or her Medical access card, but cannot update that soldier's personnel file. The same

updating the appropriate fields, the clerk transforms the RFO into an actual order. The clerk then updates the soldier's Smart ID card by saving the order on the card.

When the soldier attempts to clear a location, he or she no longer needs numerous copies of orders. When the soldier clears housing, for example, the housing clerk puts the soldier's card into the reader and copies the orders onto their computer system⁵. When it comes time to depart, the soldier goes to a kiosk and puts his or her card into the reader. From this kiosk, the soldier can depart by simply identifying the correct order which he or she is departing on. If the soldier tries to proceed earlier than authorized, the system does not allow the transaction. If the soldier has not cleared all locations on post, the system does not allow the transaction. Assume the soldier has cleared properly and is ready to depart. The departure transaction is automatically sent, in the proper format and without changing the soldier's sex or SSN, to the TAP-DB. The entire Army can now find out that soldier is on PCS leave between Germany and Fort Benning.

When the soldier arrives at Fort Benning, he or she signs into the Airborne training unit using the ID Card and everyone knows where that soldier is. While at Airborne school, the Army decides the soldier needs to go to Fort Drum instead of Fort Bragg. Since everyone knows the soldier is at Fort Benning Airborne Training company at this time, the change to orders is sent there. The soldier goes to the PCS clerk who asks for the soldier's ID card. Upon entering it into the reader, the clerk automatically retrieves the correct file and orders information. The orders are then changed and the soldier gets his or her card back with the new Fort Drum orders saved on the card.

is true for the personnel clerk. The use of this access card and the associated PIN number prevents a soldier from modifying his or her assignment instructions without proper authorization.

When the soldier departs Fort Benning, the process is similar to that in Germany. The soldier is again on leave status at his or her home in Oklahoma. Unfortunately, the soldier loses the ID card. The soldier goes to Fort Sill ID Card Section and asks for another. The clerk there issues a new card with all current assignment instructions stored on the chip. This is possible because the information was stored at the central database and not only on the local database.

The soldier finally arrives at Fort Drum - at 0300!. Taking his or her card and inserting it into the kiosk at the Fort Drum welcome station, the soldier submits the proper arrival transaction (automatically and correctly) and is given instructions as to which unit he or she is assigned and a number to call to have someone pick them up (or a number for the housing office.) The next morning, the soldier goes to the Battalion assignment clerk and is assigned to a squad/platoon and a vehicle (if applicable) using the FMS. This information is automatically transmitted to PERSCOM and the main database is updated.

4. Future Research Directions

There is a great deal more research required in this area. The suggestions we offer, especially the fielding of the smart card and the associated hardware, will be very expensive. In order to justify the expense, the Army should further analyze the benefits of upgrading the system. Other services are already going forward with procurement of the smart cards. The Marines recently announced that they were going ahead with limited fielding of the smart cards⁶. These cards will only be used in place of currency. This is

⁵ Again here, the clerk would only have "read" access and not "write" access to the orders since the clerk does not have the appropriate access card or PIN.

⁶ Jowers, Karen, "Services go forward with 'smart cards'", *Army Times*, 9 June 1997.

the first step in full use of the cards. The potential is too great to not further develop them.

The Army also needs to research all of the input and output requirements of the entire system. It would be easier, in the long-run, to make the required outputs match the required inputs. This will greatly reduce the number of translations within the system. If another agency needs information in a different format, require that they do the conversions. We should not add layers to the TAP-DB, as history has shown.

5. Conclusions

The Force XXI initiative is thrusting the combat forces and the force structures of the Army into the 21st Century. The Army is dramatically restructuring the Officer Personnel Management Systems (OPMS) to ensure the officer corps is better able to operate in a 21st Century environment. These are bold initiatives undertaken ensure the Army's systems can fight and win on future battlefields. The Army should boldly seize this opportunity to completely restructure the personnel management system for the same reasons. We cannot be satisfied with an out-dated, patchwork system for managing the most difficult and most important inventory in the world - our soldiers and their families.

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